The dawning of a new era in agriculture!

Agriculture has produced food, feed and fiber.

Now agriculture is expected to produce food, feed, fiber and biofuel.



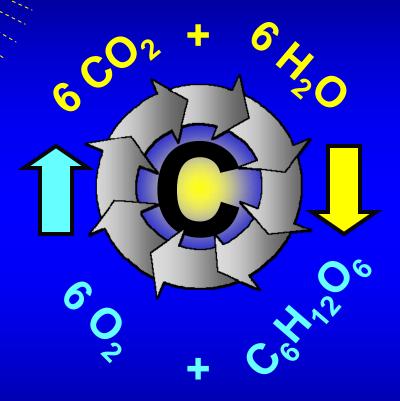
The Carbon Cycle

Photosynthesis





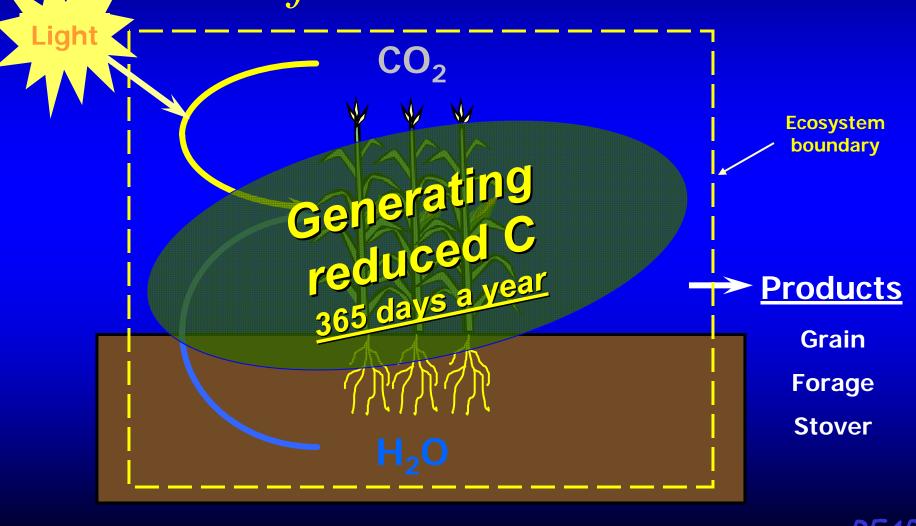
The devil is in the details!
Beckism #101





Respiration

Photosynthesis Source of Reduced Carbon



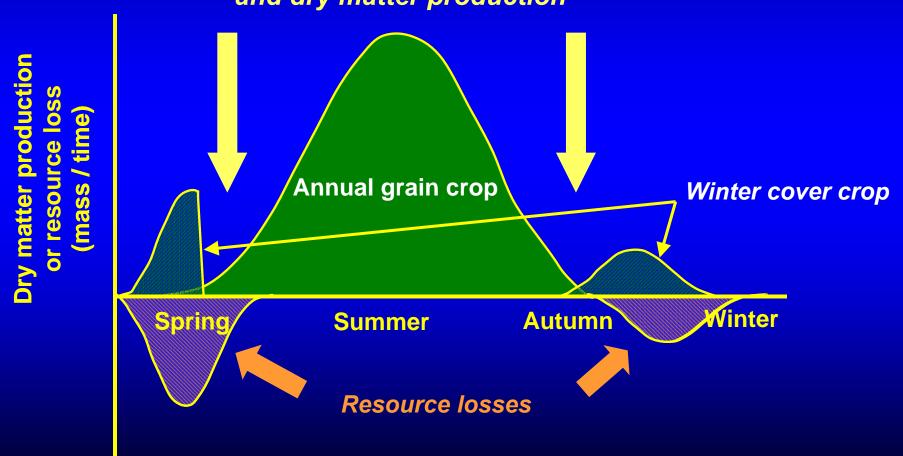
Increased efficiency... Increased pool of reduced C

- Agronomy
 - Continuous green cover
 - Optimize planting patterns, cultivars, and cultural practices
- Soil science
 - Improve water and nutrient use efficiencies
 - Precision input application
- Crop breeding
 - Improve quality
 - Enhance stress

- Physiology/morphology
 - Canopy structure
 - Root structure and function
- Biochemistry
 - Modify metabolic pathways
 - Eliminated inefficiency (photorespiration)
- Genetic engineering
 - Convert C3 species to C4
 - Use green light
 - Use all energy in photons

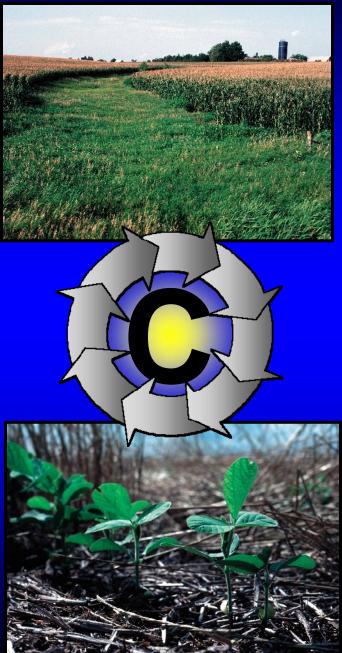
Biomass production (Annual cropping systems)

Missed opportunities for resource assimilation and dry matter production



Carbon is the "C" that starts "C"onservation!







Conservation is Linked to Bio Energy through Carbon.

Conservation



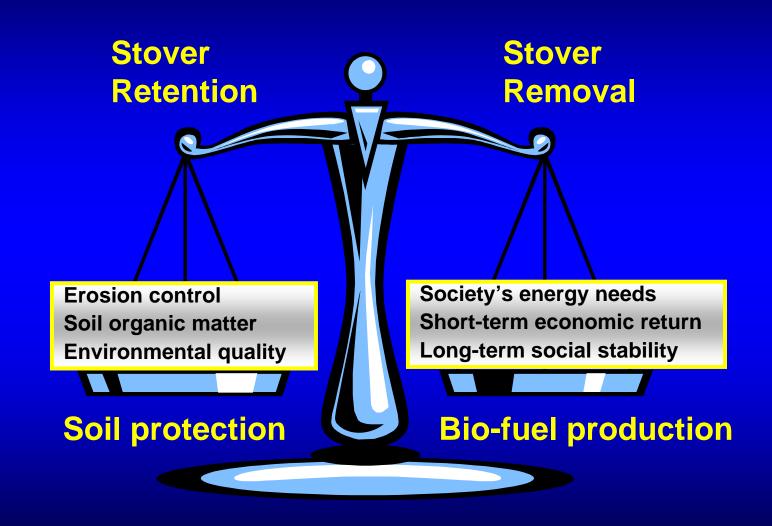






Carbon Cycle Management

Soil Conservation - Bio-energy Balance



A challenging balancing act!

Biomass Balancing Act



How do we maintain a sustainable balance?



Soil



Biofuel

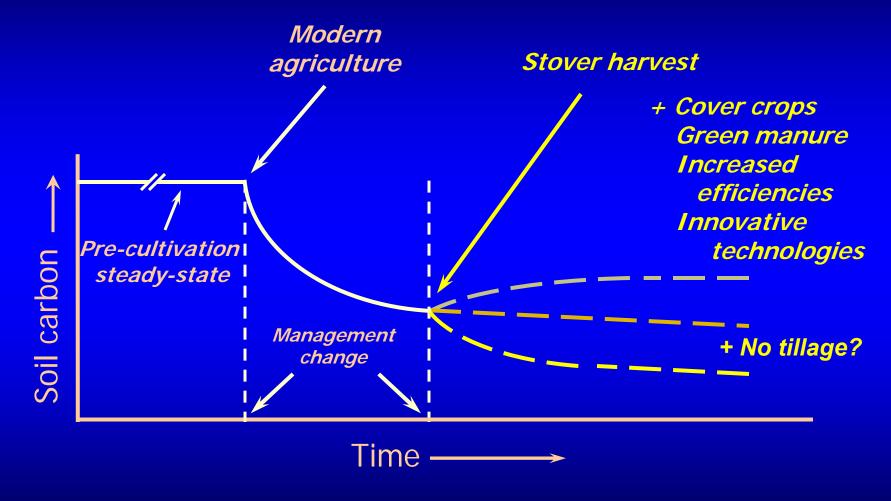
Maintain our sun, soil, water and air resources!

Is this a sustainable way to use crop biomass?



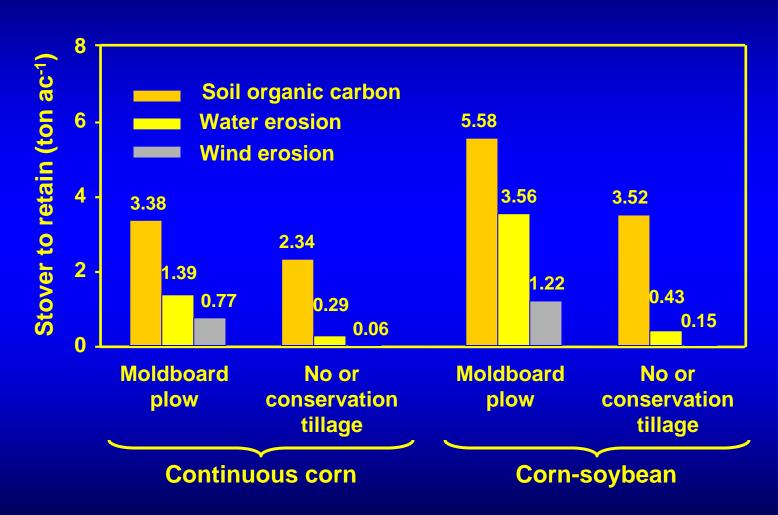
"A nation that destroys its soil, destroys itself." Franklin D. Roosevelt, 1937

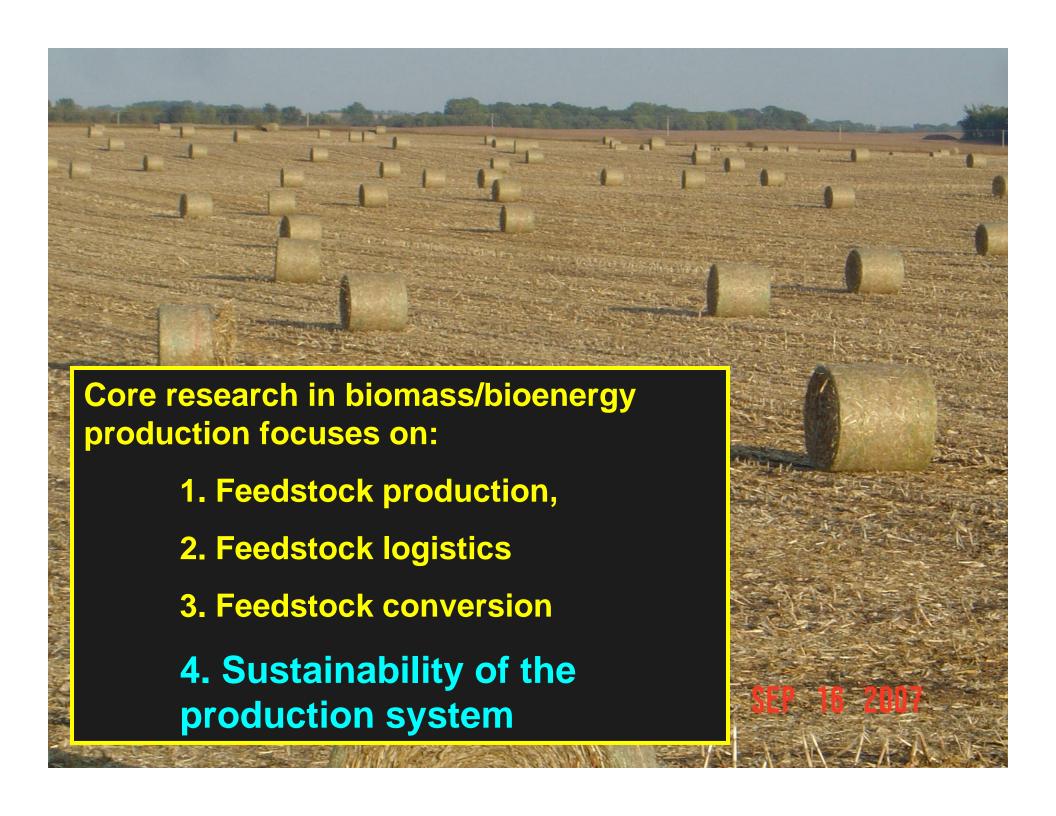
Meeting expectations sustainably



 \triangle SOC = input - output

Factors limiting crop biomass removal



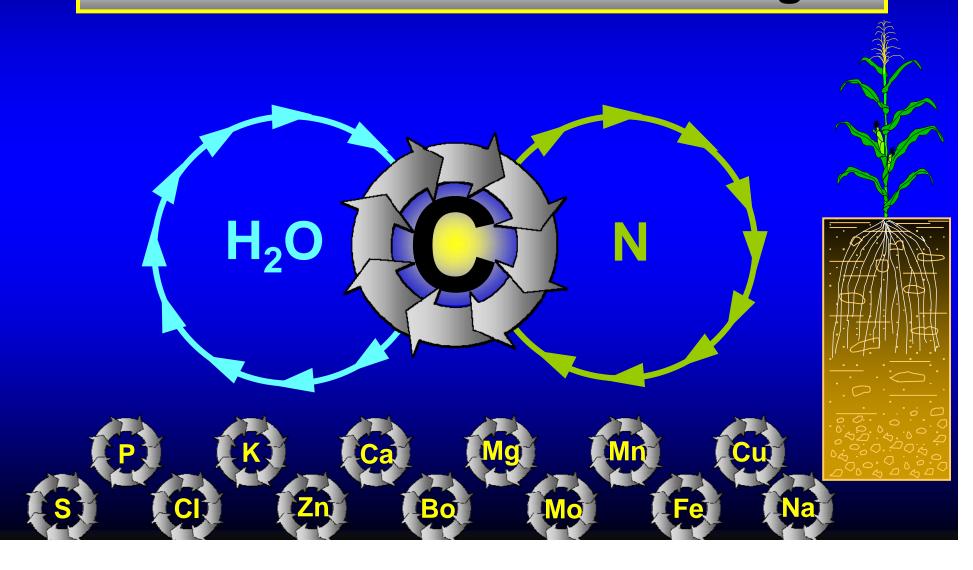


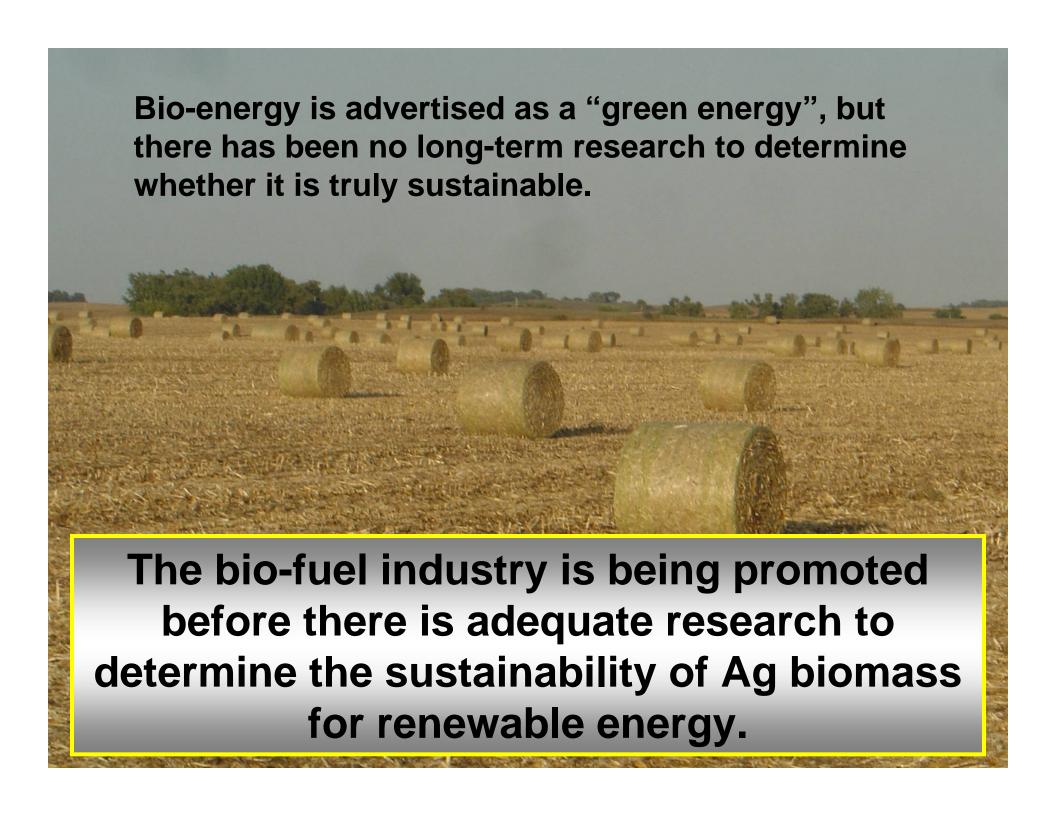


Nature's Interdependent Tri-Cycles:

Water, Carbon, Nitrogen,

Carbon is the "Lord of the Rings".





Over-arching Concerns

- Maximize capture and use of solar radiation and other inputs
- Create innovative cropping systems research environment
- Continuously and adequately fund R&D to achieve bioenergy goals
- Establish social environment of conservation

